

SECTION 301 AGGREGATE SURFACING

301.01 DESCRIPTION. This work is producing and placing one or more courses of aggregate surfacing on a prepared surface or producing and stockpiling aggregate surfacing.

301.02 MATERIALS.

301.02.1 Aggregates. Obtain aggregates from sources meeting Section 106 requirements to produce material meeting the following:

Selected Surfacing	Subsection 701.02.2
Sand Surfacing	Subsection 701.02.3
Crushed Base Course	Subsections 701.02.4 and .5
Crushed Top Surfacing	Subsections 701.02.6 and .7
Crushed Cover Aggregate	Subsection 701.02.8

301.02.2 Binder. Binder material, for binding and gradation requirements, is fine, natural soil particles or crusher dust, free from grass, roots, weeds, humus, or other deleterious matter.

Add and blend the binder material when required with the aggregate surfacing to provide material meeting the specifications.

301.02.3 Blending Material. Blending material is selected natural or crushed mineral aggregate combined with the produced aggregate to meet specifications.

Do not use pit stripping's, overburden, or other deleterious material as blending material.

Furnish and add blending material to aggregate surfacing materials when required to meet gradation requirements.

The blending material must not increase the liquid limit and plastic limit of the surfacing material.

301.03 CONSTRUCTION REQUIREMENTS.

301.03.1 Sampling, Testing, and Acceptance.

A. Production Control. Develop a quality control sampling and testing plan for production and be responsible for all sampling and testing for gradation and mechanical fracture control during aggregate production.

B. Acceptance Sampling and Testing. The Project Manager will randomly select samples taken by the Contractor and witnessed by an inspector, for gradation, fracture, and cleanness value testing from processed material on the roadway under MT-201. Samples for other tests will be taken at the point of production.

The following acceptance tests are used:

Gradation	MT-202
Mechanical Fracture	MT-217
Cleanness Value	MT-228

The largest quantity represented by each sample is 2,500 tons (2267 mt) excluding cover material, which is 500 tons (453 mt). Additional samples may be selected and tested.

The quantity represented by 5 samples is a lot when production schedules and material continuity permit. The Project Manager may establish a lot consisting of a quantity represented by 3 to 7 consecutive random samples when there are short production runs, significant material changes, or other unusual characteristics of the work.

- C. **Acceptance.** Surfacing aggregates are evaluated for gradation, mechanical fracture, and cleanness value on a lot-by-lot basis. The upper and lower limits in the Gradation Tables in Section 701 are the upper and lower limits in the evaluation formulas. The specified minimum fracture and cleanness values are the lower limit.

Acceptance is made under Subsection 105.03.2.

301.03.2 Equipment.

- A. **Rollers.** Use rollers meeting Subsection 210.03.4 requirements.
- B. **Watering Equipment.** Use watering equipment meeting Subsection 210.03.5 requirements.
- C. **Scales.** Furnish scales meeting Subsection 109.01.1 or use certified permanently installed commercial scales. Furnish and have readily available at least ten 50-pound (22.7 kg) weights for testing contractor furnished scales. Furnish housing for the scale recording devices. Scale accuracy must be one-half of one percent at any weight.

Alternate weigh methods or devices may be acceptable, if they produce the required accuracy. Platform and belt-conveyor scale requirements are as follows:

1. **Platform Scales.** Use platform scales having the length to weigh an entire vehicle in an unbroken operation.

Truck-trailer combinations may be weighed separately:

 - a. If the scale approaches are compacted gravel or asphalt;
 - b. Are long enough and level with the scale platform to accommodate the entire truck-trailer units;
 - c. Are continually maintained.

Release all brakes as the unit is weighed.
2. **Belt-Conveyor Scales.** Belt-conveyor scales may be used for non-asphaltic materials if the scale meets the general requirements for scales in Subsection 109.01.1 and the following:
 - a. The scale meets the National Bureau of Standards requirements for belt-conveyor scales, except as modified below;
 - b. A daily static-load test is made after approximately ½ hour of continuous belt conveyor operation and whenever the air temperature varies 15 °F (9 °C) or more. Have a calibration test performed once daily and whenever the daily static-load test shows adjustments are required;

- c. Make calibration computations, calibration procedures and results, and related documents available for the Project Manager's review. Clearly mark test chains with calibration constants. Carry test chains and test weights in protective containers and make immediately available for belt-conveyor scale testing.
- d. Perform accuracy checks by checking the average of 5 or more sequential payloads of hauling units on approved platform scales. The acceptable accuracy is plus or minus 0.5 percent of the payload of the average hauling unit. If the recording odometer of the belt-conveyor scales in use is graduated to 1/10-ton (200 lb) (91 kg) increments and is a cumulative recording process, differences in readings and variations less than 1/10-ton (91 kg) may carry over from one hauling unit to another. Conveyor weight conformation is based on the tonnage obtained from readings taken from the sealed odometer at the beginning and end of each check period. The number of check loads will be increased should the test results fluctuate.

Furnish a lock to secure the recording tape, odometer, totalizer, calibration adjustment, and clock-time imprinter. The Project Manager will lock the equipment and retain the keys before materials are delivered to the roadway.

301.03.3 Reject. Dispose of reject material produced from Department sources as directed.

301.03.4 Reserved

301.03.5 Aggregate Surfacing Construction.

- A. Surface Preparation.** Prepare the existing roadway surface meeting Section 204 immediately before placing surfacing material.

Do not place aggregate surfacing material on:

- 1. Any surface not meeting the dry density requirements for that surface;
- 2. A rutted or frozen subgrade or aggregate surface;
- 3. Any surface not meeting grade or surface smoothness specifications.

- B. Pugmill Mixing.** Pugmill mix all surfacing aggregates except crushed cover aggregate.

Uniformly mix aggregate surfacing and water in a central plant pugmill mixer. Proportion all blending material, filler, and binder by weight to within plus or minus one-half of one percent of the specified quantity before mixing.

Add the water needed to reach the specified density.

Additional water may be added only once to the aggregate surfacing once its placed on the roadway to replace moisture lost to surface evaporation. If additional water is needed, pick up the mixture and remix it in the pugmill.

- 1. **Placing.** Transport, place, and spread aggregate surfacing on the roadway immediately after mixing.

Spread in maximum 8-inch (205 mm) compacted layers to the required grade and typical section. Spot filling of low areas is prohibited.

- C. Road Mixing.** When specified, place, mix and spread the surfacing aggregates on approved surfaces at optimum moisture using motor graders or other approved equipment.

Water may be added to the aggregate to reach optimum moisture during or after crushing.

Once uniformly mixed, spread each layer of material to the specified typical section without causing segregation. Roller compact the spread layer.

Add binder only after it is approved for use.

Uniformly spread the binder over the loose spread surface course. Blend and mix binder uniformly into the surfacing material using approved methods and equipment.

For courses 3-inches (75 mm) thick or less, work the binder into the entire depth. For course depths exceeding 3-inches (75 mm), work the binder into the upper 3-inches (75 mm).

Correct or remove equipment from the work failing to maintain uniform gradation of the material for the entire width and thickness.

- D. Compaction.** Compact aggregate surfacing to 98 percent of the target density.

The initial target density is the average of the maximum density of at least two tests on samples representing the material to be compacted. Maximum density is determined by MT-230.

The Project Manager will take samples from the materials placed on the roadway. They will be tested and the results averaged with the previous tests to determine a new target density for the material remaining to be placed.

The Project Manager will establish a target density for each course, grade, and type of surfacing aggregate. A new target density will be established if the aggregate characteristics change.

Each lift of surfacing aggregate will be divided into 2000 foot long (610 m) sections. The in-place dry density of each lift is determined within each section at 10 randomly selected locations. The average of the 10 tests must exceed 98 percent of the target with not more than 2 out of the 10 tests being less than 98 percent of the target.

Be responsible for controlling compaction and all necessary control testing.

Notify the Project Manager once compaction is complete on a section so it may be tested.

Re-compact sections not meeting density requirements.

Re-compacted sections will be tested at 10 new random locations.

Compaction and testing will continue until the section meets density requirements.

Densities will be determined using MT-210, MT-212, MT-215, MT-218, and MT-230.

- E. Trimming.** Trim each course of compacted aggregate surfacing to the specified grade and section.

Use trimmings on the inslopes, on sections of uncompleted roadway or return to the pit area. When quantities are measured by the ton (metric ton), excess material returned to the pit are deducted from the pay quantities.

- F. Restrictions.** The Project Manager may restrict equipment speed and load weights to prevent damage to existing and new work, public thoroughfares or safety.

- G. Surface Smoothness.** Finish the aggregate surface to the specified grade within the following tolerances:

<u>Aggregate Size</u>	<u>Tolerance</u>	<u>Distance</u>
1-1/2" (40 mm) and larger	0.08 foot (24 mm)	30 feet (9.2 m)
1" and less (25 mm)	0.04 foot (12 mm)	60 feet (18.4 m)

301.04 METHOD OF MEASUREMENT.

301.04.1 Aggregate. Aggregate surfacing, blending material, fillers, binder, water, producing, handling, mixing, hauling, placing, spreading, compacting, trimming, use of trimmings, maintenance and all necessary incidentals to complete the work is measured by the cubic yard (cubic meter) or ton (metric ton), as specified.

When removing oversize surfacing material from the roadway, the oversize material is measured by the ton, (metric ton) returned to the aggregate source, and deducted from the total surfacing material placed on the roadway.

- A. Measurement By The Ton.** Aggregate surfacing is measured by the ton (metric ton) under Subsection 301.03.2(C).

Excess material removed from the roadway and returned to the pit area is deducted from the pay quantities.

- B. Measurement By The Cubic Yard.** Aggregate surfacing is measured by the cubic yard (cubic meter), under the applicable provisions in Subsection 109.01, from:

1. Plan dimensions; or
2. Haul vehicles; or
3. In-place roadway or stockpile volumes.

When measured in place, each course thickness of each grade of surfacing aggregate will be measured at random locations in a section. The section length and number of measurements is the Project Manager's discretion. The thickness measurements for each section are averaged and the average must equal or exceed the plan thickness. The minimum measured thickness at any location must be at least plan thickness less ½ the largest aggregate size permitted for the material.

Bring all sections of a completed course not meeting these specifications into compliance before placing the next course.

Aggregate surfacing for small or irregularly shaped areas ordered in writing by the Project Manager, are measured in the haul vehicle under Subsection 109.01.

Aggregate surfacing to fill in subgrade low areas or placed outside the lines and slopes shown in the plans or established by the Project Manager is not measured for payment.

301.04.2 Binder. Binder added at the crusher plant is included in the measurement for the aggregate material.

Binder added to the surfacing material once placed on the roadway is measured by the cubic yard (cubic meter) or ton (metric ton) under Subsection 301.04.1(A) or (B).

When specified as a contract item, haul on binder is measured by the mile-yard (kilometer-cubic meter) or ton-mile (ton-kilometer) under Subsection 206.04.2.

When not specified as a contract item, haul on binder is not measured for payment.

301.04.3 Existing Surface Preparation. When specified, existing surface preparation is measured under Subsection 204.04.

When existing surface preparation is not specified, it is incidental to and included in Aggregate Surfacing.

301.04.4 Aggregate Haul. Aggregate haul is not measured for payment unless specified. If specified, it is measured under Subsection 206.04.2.

301.04.5 Compaction. Compaction is incidental to Aggregate Surfacing.

301.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Aggregate	Cubic Yard (cubic meter) or Ton (metric ton)
Binder	Cubic Yard (cubic meter) or Ton (metric ton)
Binder Haul	Mile-Yard (kilometer-cubic meter) or Ton-Mile (metric ton-kilometer)
Existing Surface Preparation	See Subsection 204.05
Aggregate Haul	Ton-Mile (metric ton-kilometer) Mile Yard (kilometer-cubic meter)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the Contract.